

What is claimed is:

1. A wastewater treatment apparatus for removing nitrogen and phosphorus having an anaerobic tank, an anoxic tank, an aerobic tank and a clarifier, wherein the aerobic tank includes has a baffle installed at one side thereof to form a dissolved oxygen reducing zone for reducing the concentration of dissolved oxygen contained in internally recycled wastewater returned from a dissolved oxygen reducing zone while increasing the concentration of dissolved oxygen contained in treated effluent supplied from a part other than the dissolved oxygen reducing zone of the aerobic tank to a clarifier in a subsequent stage.

2. The wastewater treatment apparatus according to claim 1, comprising:

a pre-anoxic tank to which sludge returned from the clarifier and some of raw wastewater are introduced;

an anaerobic tank to which the wastewater treated by the pre-anoxic tank and some of raw wastewater are introduced and in which a phosphorus release reaction by microorganisms occurs under anaerobic conditions;

a denitrifying phosphorus accumulating organism (dPAO) tank to which the wastewater treated by the anaerobic tank and the wastewater treated by a dissolved oxygen reducing zone of the aerobic tank are introduced and in which denitrification and removal of phosphorus occur at the same time by dPAOs;

an anoxic tank to which the wastewater treated by the dPAO tank and some of raw wastewater are introduced and in which denitrification of nitrate nitrogen occurs under anoxic conditions; and

an aerobic tank to which the wastewater treated by the anoxic tank is introduced and in which nitrification and luxury uptake of phosphorus occur with supply of oxygen.

3. The wastewater treatment apparatus according to claim 2, further comprising a clarifier for settling solid components in the wastewater treated by the aerobic tank.

4. The wastewater treatment apparatus according to claim 2, wherein the pre-anoxic tank, the anaerobic tank, the dPAO tank, the anoxic tank and the aerobic tank are installed in a reaction tank divided by a plurality of compartments.

5 5. The wastewater treatment apparatus according to claim 2, wherein the raw influent is introduced by a step feed system.

6. A wastewater treatment method using the apparatus according to any one of claims 1 through 5, comprising:

10 supplying raw wastewater to a pre-anoxic tank, an anaerobic tank and a dPAO tank;

denitrifying nitrate nitrogen using organic matter contained in the raw influent of the pre-anoxic tank;

15 conducting a phosphorus release reaction by microorganisms using the treated wastewater fed to the anaerobic tank after passing through the pre-anoxic tank and the raw wastewater fed to the anaerobic tank;

introducing the wastewater treated by the anaerobic tank to the dPAO tank to conduct denitrification and removal of phosphorus at the same time by dPAOs;

20 conducting denitrification of nitrate nitrogen using the treated wastewater fed to the anoxic tank after passing through the dPAO tank and the raw wastewater fed to the anoxic tank;

introducing the wastewater treated by the anoxic tank to an oxic tank to conduct nitrification of ammonia nitrogen and luxury uptake of phosphorus at the same time; and

25 reducing the content of dissolved oxygen contained in the treated wastewater from a dissolved oxygen reducing zone of a baffle installed in the aerobic tank to return the wastewater to the dPAO tank and increasing the content of dissolved oxygen contained in the treated effluent supplied from a part other than the dissolved oxygen reducing zone of the aerobic tank to a clarifier in a
30 subsequent stage.

7. The wastewater treatment method according to claim 6, further comprising introducing the wastewater treated by the aerobic tank to the clarifier,

settling solid components and returning some of the settled sludge to the pre-anoxic tank.